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Specification and Drawings, as originally filed, with Application for Patent Serial No: **2,452,967**, on December 31, 2003, by **BUD T.J. JOHNSON**, for "Wind Powered Turbine Engine - Speedball Configuration".

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WIND POWERED TURBINE ENGINE
Speedball Configuration

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ABSTRACT

This invention changes the nature of what would usually be referred to as wind turbines. It has an internalized containment and control chamber to more specifically access a maximum amount of energy from its wind throughput, similar to a steam or gas turbine engine. With a wind intake multiplier system providing both compression and intake velocity increase, it has the equivalent of a super charger surrounding its intake aperture. This is followed by a containment cylinder arrangement slightly outside the tips of its propeller blades, whereby a very high percentage of its wind throughput is accessed by twelve blades. With an extended wind throughput chamber, it could accommodate more blades on an extended rotor, to the point of harnessing a maximum amount of energy from the wind. Functionally, the sequence described above is much the same as that applied in a steam or gas turbine engine, under similarly controlled conditions. The only difference is that there is no heat involved in the sequence. This invention has a much smaller profile or cross-section area than any examples of present state of the art wind turbines, designed to provide a similar output of captured wind energy. Its profile will blend more easily into the surrounding environment, and sound waves it generates can be modulated to far less bothersome levels by means of existing technology, as its configuration allows for the convenient placement of such technology and related devices.

BACKGROUND OF THE INVENTION

The inventor has studied examples of present state of the art wind turbines of the propeller type. It was apparent that certain improvements could be made to harness a higher percentage of

energy from a given cross section of wind accessed by their propeller blades. Based on principles of physics and aerodynamics known to the inventor, some serious possibilities were apparent.
At the present time, there is a growing demand for environmentally clean energy production. Costs of maintenance including the repair of weather damage to suburban and rural electrical distribution systems has reached the point where such systems are no longer profitable. This situation now provides adequate incentive toward the invention and development of wind power based electrical generation in the range of fifty kilowatts to one megawatt.

OBJECTS OF THE INVENTION

The inventor had determined that successful attainment of the following objects would lead to the development of a new type of wind power unit with a very high level of efficiency:
Firstly, to deal with the matter of recovering and harnessing wind energy not being captured by the inner fifty percent of the radius length of propeller blade systems as common to present state of the art wind turbines.
Secondly, to produce a wind power unit to harness useable levels of energy from a broader range of wind speed.
Thirdly, to create a wind power unit capable of recovering a maximum percentage of energy from the wind. In other words, can we build a wind power unit as efficient as steam and gas turbines ?
Fourthly, to design and put together a wind power unit which presents a lower or much less imposing cross section within its environment, or a combination of both.

BASIC DESCRIPTION AND IMPROVEMENTS OVER PRESENT STATE OF THE ART

Existing propeller turbine wind power units of present state of the art are not harnessing a very high percentage of energy from the cross section of wind addressed by such units. Three bladed propellers do not harness much of that energy, and present state of the art arrangements with larger numbers of blades might present some

improvement within the scope of smaller sized systems. However, they are more limited to a torque type of power output. The inner fifty percent of the radius of propeller driven wind power systems is not harnessing much of the cross section of energy being addressed. Such systems must be shut down at a lower wind speed than with three bladed systems. The most practical solution to dealing with the inner fifty percent of the radius of propeller blades from their axle center, is to efficiently block off that area, and access the redirected energy with turbine blades radially beyond the blocked off area.
This invention in its presently preferred embodiment, employs a spherical head arrangement, hereinafter referred to as a "speedball" in front of, and covering more than fifty percent of the radius from axle center to the outer tips of its turbine blades. The speedball increases the velocity of the redirected wind energy, to address a larger number of shorter turbine blades.
Present state of the art wind turbine systems tend to be limited as to the full range of wind speed from which they can harness a useful amount of wind energy. The spherical head arrangement increases the speed of the wind redirected from that inner fifty percent of the center to blade tip radius of the turbine rotor and blade assembly, but the faster moving wind is inclined to address only the inner radial portion of the turbine blades.
To even out wind flow through the operating aperture containing the multi-bladed turbine rotor, an annular ring scoop arrangement is used to scoop inward a larger volume of incoming wind, toward the said shorter and more numerous turbine blades. This annular ring scoop is further designed with an inner facing airfoil arrangement, which also increases the velocity of the captured wind, much the same as is being done by means of the said spherical head. The overall objective is to increase incoming wind speed, and then have this faster moving wind evenly address the aperture containing the larger number of shorter turbine blades.
Through the combination of an extended length outer periphery airfoil on the annular ring scoop assembly, and an outward expansion proceeding to the rear end of the inside surface of the said annular ring scoop assembly behind the turbine rotor and blades assembly, a lower pressure or vacuum exhaust situation is achieved.

In real terms, we now have a wind turbine engine, with supercharging at its intake, compression within the cylindrical encasement of its turbine rotor and blades, with all of its blades adequately addressed by faster moving wind. This is followed by an exhaust area of continuously lowering pressure, behind the turbine rotor and blade assembly. All of the basic attributes of a turbine engine are now present within this embodiment. In the particular case of this wind turbine engine, its turbine blades will have full range pitch control. Full range pitch control is considered essential in this embodiment, to most efficiently access a full range of wind speeds, as well as being able to set the turbine blades at full open neutral in the case of excessively high wind speeds.

What is now readily apparent, is that with a much higher level of efficiency, we are now dealing with a new situation where a wind turbine engine will be rather small in size, against its output potential, compared to wind turbines of present state of the art.

With this invention, we now have a new concept for engineers and other people skilled in the art to work with. A number of improvements will be made, as is usual, to the point where an absolute maximum amount of wind energy will be harnessed by future versions of this invention.

Although this preferred embodiment is primarily meant to serve as a wind energy harnessing device to operate within a range of fifty kilowatts to one megawatt, the inventor presently sees its upward range of output potential in the order of five megawatts. Those skilled in the art have already expanded three bladed propeller systems to where their largest wind turbines have two and a half megawatts of potential output. Future large versions of the present invention should be able to double that figure.

The inventor anticipates some potential toward the use of special embodiments of this invention in water power and drive applications, and perhaps also with regard to high efficiency air circulating fan systems.

DETAILED DESCRIPTION

Figure 1 is a partially cut away side view of a preferred embodiment of the invention, as mounted on the rotatable top of its support tower platform, with turbine rotor and twelve propeller blades, and with its annular ring hoop cross section cut away to the point of a vertical center line. Five of its blades are also cut off to show a blade cross section on the two remaining blades shown in the illustration. Other details, being mechanical in nature, would be present state of the art, and do not need to be shown to illustrate the essential principles, details and novelty of the inventive concept.

Figure 2 is a frontal view of the same wind turbine engine embodiment, as mounted on its rotatable tower top, illustrating its wind capture area, annular ring scoop, turbine blades, and airfoil covered support and reinforcement members for the annular ring scoop and internalized axle and drive system.

Figure 3 is a rear view of the same wind turbine engine on top of its tower mounting, as it would look directly from the rear.

Figure 4 is a side view of the wind turbine engine, on top of its tower mounting, as it would look directly from the side, (similar in appearance to a jet turbine engine) mostly enshrouded by its extended annular ring scoop.

Figure 5 is a simplified drawing of a three row blade system, as might be applied to the turbine rotor, and within the flow through and turbine drive chamber respectively, with the two rings of radially straight and stationary stabilizer blades being mounted to the inside surface of the flow through and turbine drive chamber.

With all of the foregoing in view, and such other and further purposes, advantages or novel features as may become apparent from consideration of this disclosure and specification, the present invention consists of the inventive concept which is comprised, embodied, embraced or included in various specific embodiments of

such concept, reference being made to the accompanying figures, in which:

Figure 1is a partially cut away side view of a preferred embodiment of the invention, as mounted on the rotatable top of its support tower platform, where we have the outer front edge of wind intake aperture 1, wind flow channel 2, inside facing surface of flow through and turbine drive chamber 3, turbine blades 4, of which seven are shown, as mounted on turbine rotor 5. Annular ring intake scoop 6, speedball half sphere wind displacement and velocity head 7, encasement body for driveshaft, mechanicals and generator components 8, then we have structural support and reinforcement members 9, rotatable flat topped support table for the entire wind turbine engine assembly and related components, and the top end of support tower 10.
Annular ring intake scoop 6, serves three purposes, where firstly, its sharp outer front edge defines and becomes the outer boundary of the entire front wind intake area of the wind turbine engine, secondly, its low profile "S" curved inner front surface is carefully designed, where its compound curve will speed up incoming wind to about the same extent as the speedball wind displacement and velocity head, thirdly, its inner face beyond the outside ends of turbine blades 4, becomes the inside facing of flow through and turbine drive chamber 3, fourthly, its outside airfoil curve speeds up the wind flowing past and around its outside surface, enhancing the low pressure exhaust area, beginning just behind turbine blades 4, fifthly, the progressively outwardly expanding inner face of the said annular ring intake scoop is shaped in that fashion to assure an expanding low pressure exhaust area behind turbine blades 4.
Speedball half sphere wind displacement and velocity head 7, serves three main purposes, where firstly, it blocks off a bit more than fifty percent of the radius from driveshaft axle center to the outer tips of turbine blades 4, secondly, it speeds up and redirects the incoming wind it displaces directly outward to address the turbine blades 4, thirdly, it provides a convenient front cover for larger diameter turbine rotor 5, which provides and ideal mounting area and surface for the twelve short turbine blades 4.

Figure 2 is a frontal view of the same wind turbine engine embodiment, as mounted on its rotatable tower top floor 10, where we have an unobstructed direct frontal view of annular ring intake scoop 6, speedball wind displacement and velocity head 7, turbine blades 4, structural support and reinforcement members 9, rotatable tower top floor 10, and the stationary top end of support tower 11. What we are seeing here is quite similar to the frontal view of a large jet turbine engine as one might observe on our largest passenger jet aircraft.

Figure 3 is a rear view of the same wind turbine engine on top of its rotatable tower top floor 10, as placed at the top end of fixed support tower 11, where we can further observe the rear end of annular ring air intake scoop 6, encasement body 8, structural support and reinforcement members 9, and turbine blades 4.

Figure 4 is a side view of the wind turbine engine, on top of its rotatable tower top floor 10, as placed at the top end of fixed support tower 11, where we can further observe the outside curved cylindrical surface of annular ring intake scoop 6, rear projection of encasement body 8, and exposed structural support and reinforcement members 9.

Figure 5 is a partially cut away side view of a second preferred embodiment of the invention, with two rows of twelve turbine rotor blades, mounted on its drive rotor, where the said two rows of turbine blades are spaced some distance apart on the said drive rotor, and where a fixed stationary non-rotating ring of twelve thin neutral pitch flow stabilizer blades is installed between the said two rows of turbine blades, and the said ring of twelve stabilizer blades serves the purpose of smoothing and straightening out air flow between the front row and back row of turbine blades, similar to such systems in other turbine engines, where, the front row of turbine blades 12, is separated from the back row of turbine blades 13, by neutral pitch, stationary non-rotating stabilizer blade system 14, and where stabilizer blade system 14, is firmly mounted and attached to the inner circumference of flow through and turbine drive chamber 3.

All other elements shown in figure 5 have been described in figures 1, 2 and 3.

CLAIMS

Based on the foregoing detailed description, together with further related comments and explanations, the objects of the subject invention, as set forth herein above have been addressed adequately, and are easily achievable. Also, while there is shown and described, preferred embodiments of the invention, it is understood that the invention is not limited thereto, but may be otherwise variously embodied and applied within the scope of the following claims. Accordingly,

What is claimed is:

1. A wind turbine engine.

2. A wind turbine engine with its drive rotor situated within an internalized throughput containment and control chamber, assuring that a maximum amount of wind throughput must drive its turbine rotor blades.

3. A wind turbine engine which has its rotor blades situated within the outer half of the radius from axle center to the tips of its rotor blades, and which also redirects all incoming wind throughput displaced by the blocked off remainder of the rotor, toward driving its rotor blades.

4. A wind turbine engine which has the inner fifty percent or more, within its front intake area, of its radius from drive axle center to the outer tips of its turbine blades, blocked off by a forward extending or protruding half spherical head, which speeds up and redirects incoming wind around the said half spherical head, to where it must address and pass through its turbine blades to produce useful power.

5. A wind turbine engine which has an outer reaching front aperture which entraps, speeds up, compresses and redirects incoming wind to the front intake aperture of its turbine rotor and blade assembly.

6. A wind turbine engine with enternalized wind throughput containment and control chamber with its inner circumference close to the outside tips of its rotor blades, much the same as in a steam or gas turbine engine.

7. A wind turbine engine with the sequential features of enlarged or supercharged intake, functions of wind velocity increase, compression, enclosed turbine blades within a controlled tightly surrounding chamber, followed by a low pressure exhaust area, much the same as a steam or gas turbine engine.

8. A wind turbine engine having all of the basic functions of a steam or gas turbine engine, with the exception of heat.

9. A wind turbine engine which may be placed or housed in a self-containment enclosure, where such housing, exterior embodiment or enclosure may be shaped or designed in such a fashion that it may blend more easily into its environment or area of emplacement, to where it is less imposing to, and more attractive within the said surrounding environment or area of emplacement.

10..A wind turbine engine which can provide useable power output at wind speeds ranging from ten to more than one hundred kilometers per hour.

11. A wind turbine engine which can be built in a range of sizes to generate electrical power output from one kilowatt to as much as two and a half megawatts or more.

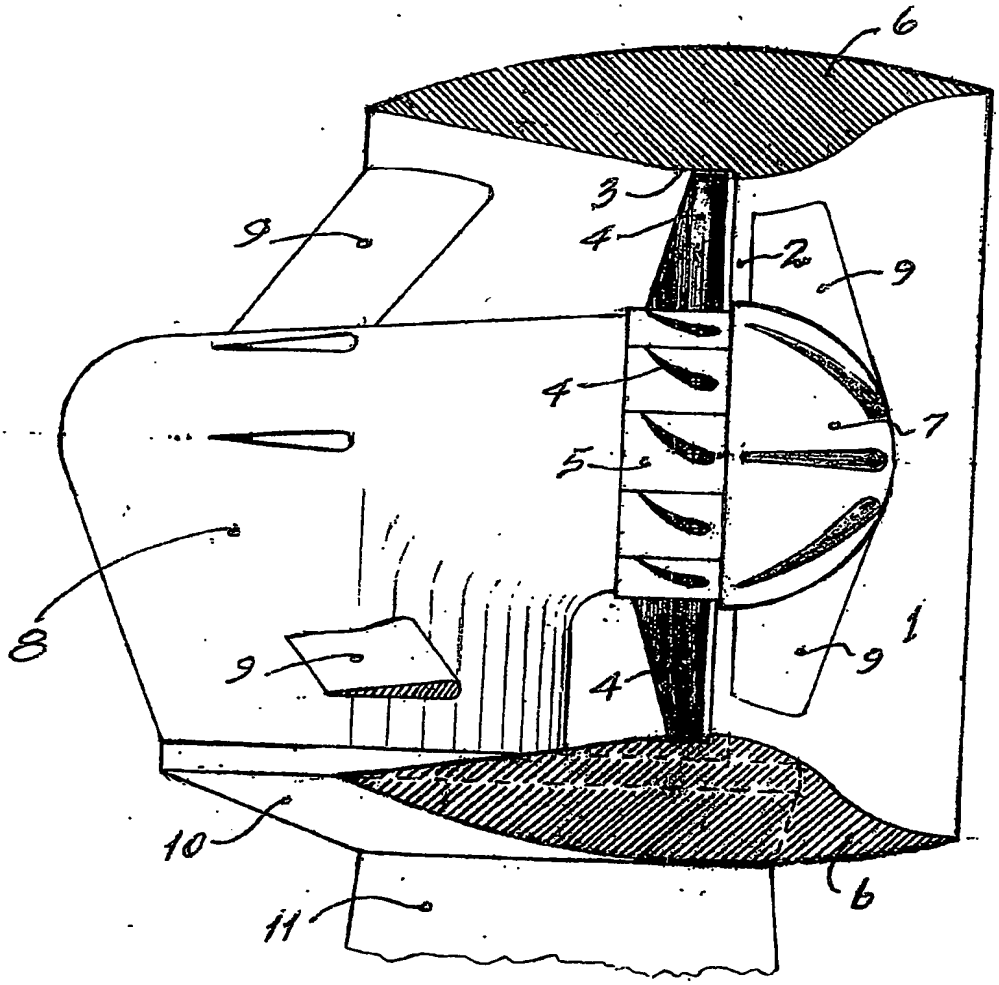

Figure 1

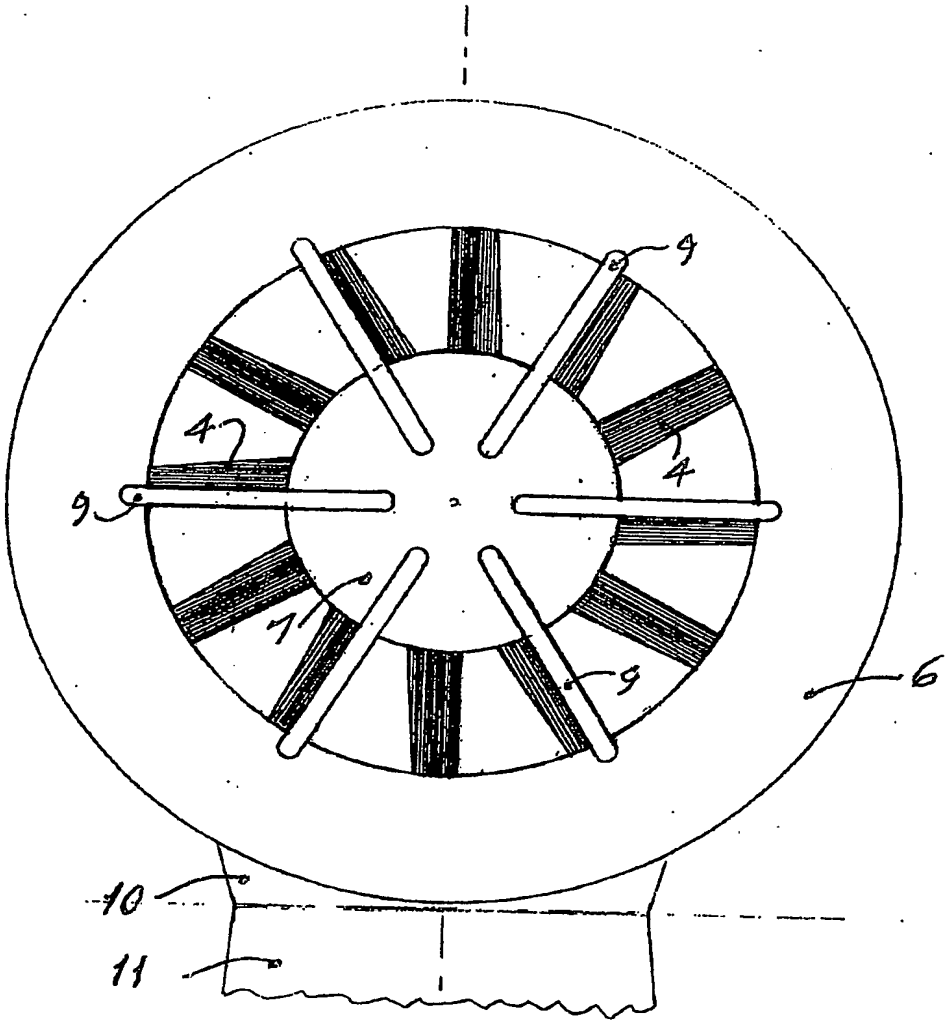

Figure 2

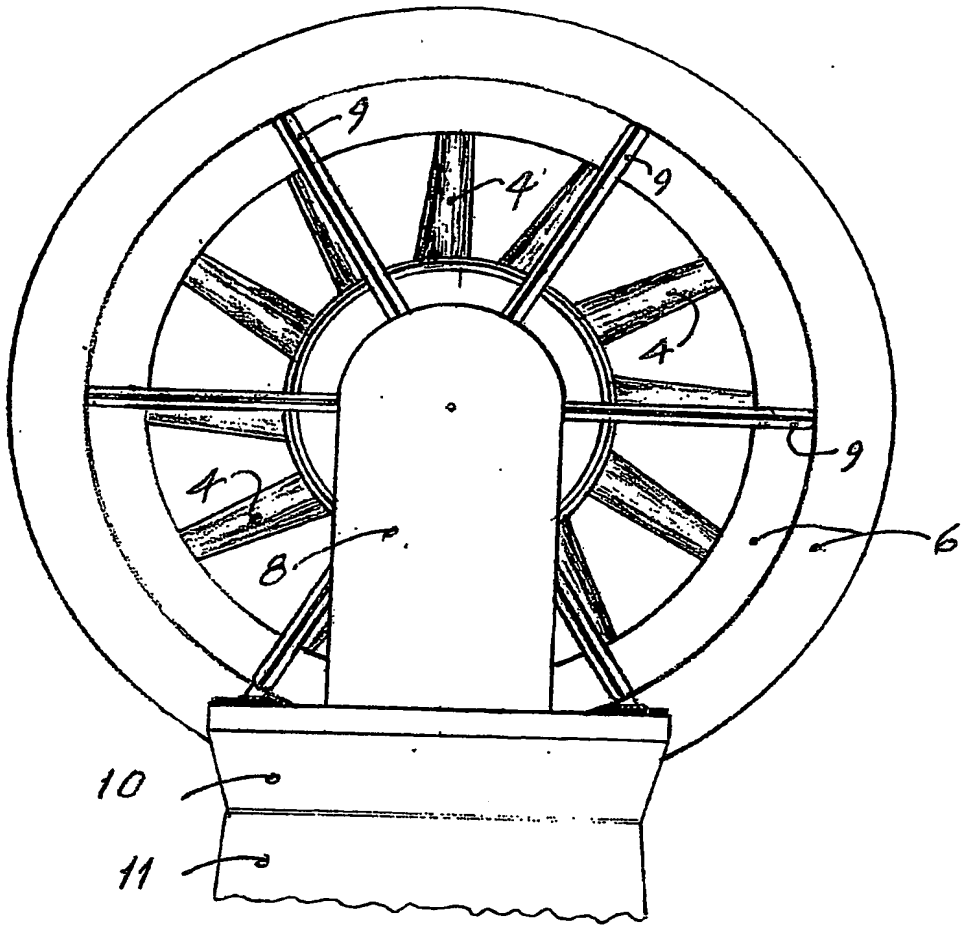

Figure 3

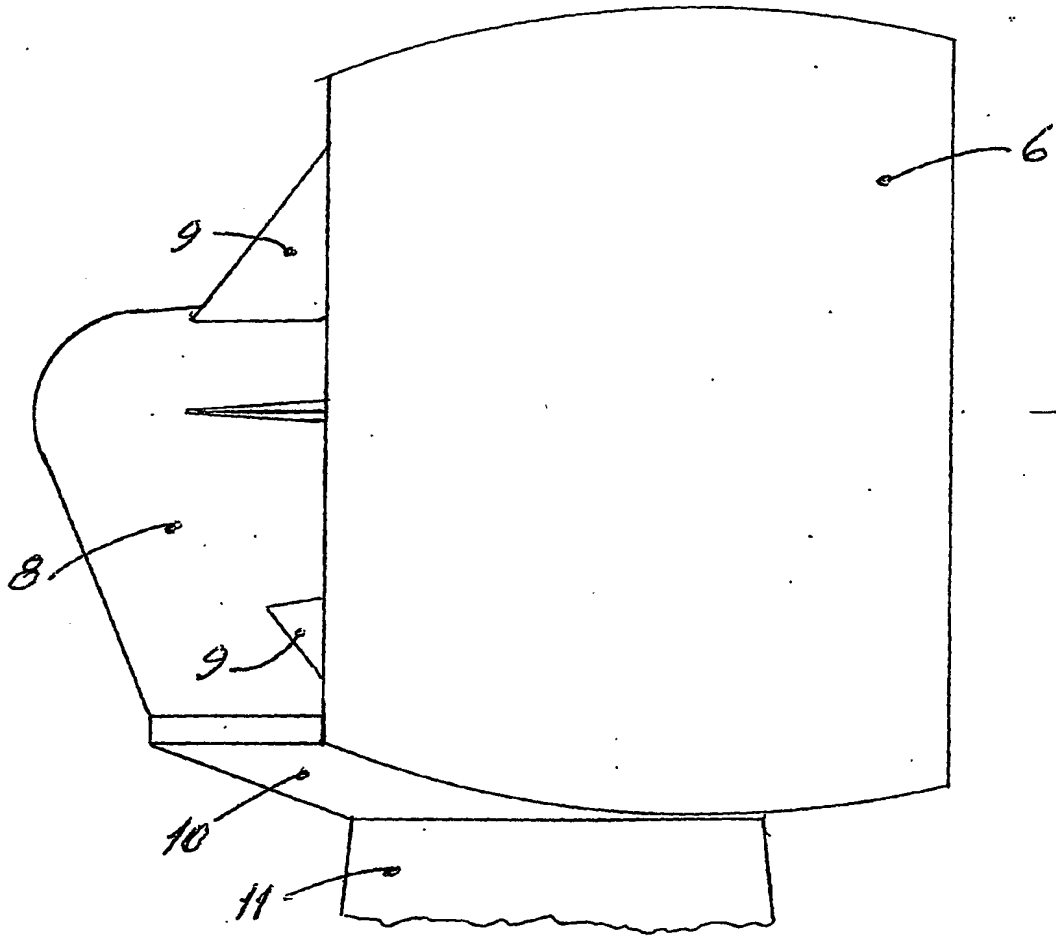

Figure 4

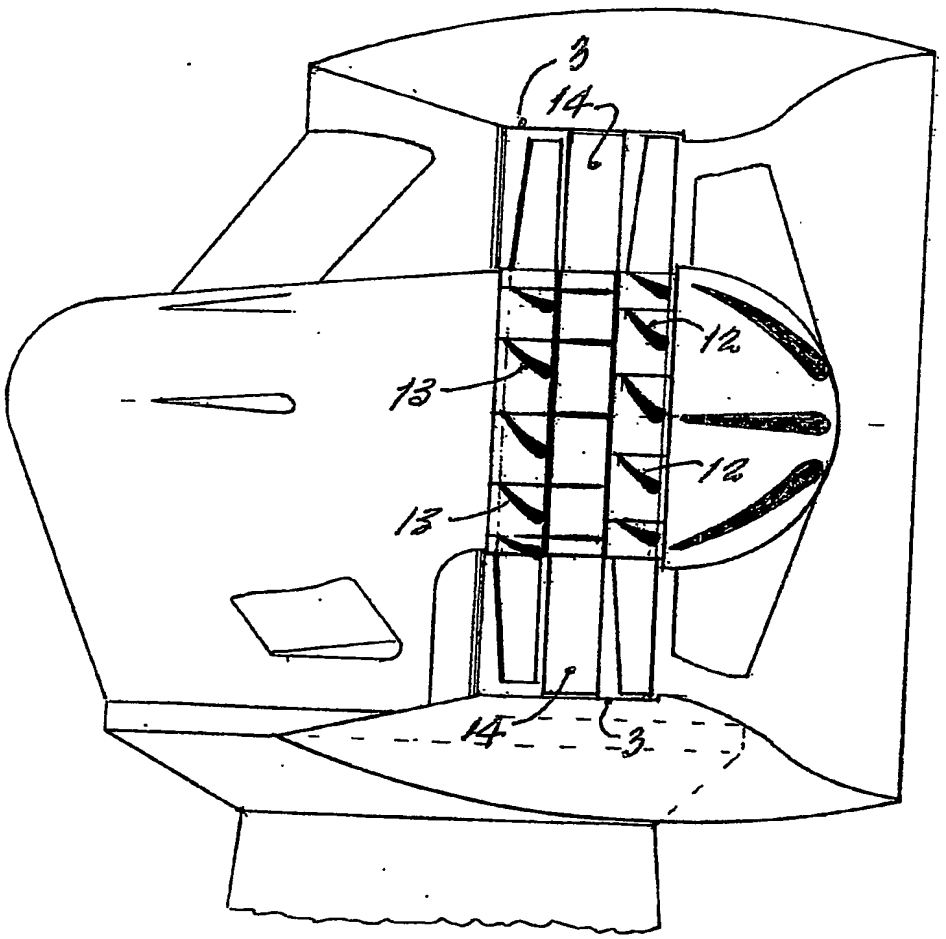

Figure 5

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